

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claim 29 is being added. No new matter is added.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 15-29 are now pending in this application.

Rejections under 35 U.S.C. § 103

Claims 15, 27 and 28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over EP 1,174,600 A2 to Kobayashi et al. ("Kobayashi") in view of U.S. Patent No. 6,574,956 to Moraal et al. ("Moraal"). Claims 16, 17, 20-24 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kobayashi in view of Moraal, and further in view of U.S. Patent No. 5,974,791 to Hirota ("Hirota"). Claims 18-19 and 25 stand rejected under § 103(a) as being unpatentable over Kobayashi in view of Moraal and Hirota, and further in view of certain legal precedent. Applicants respectfully traverse these rejections for at least the following reasons.

The device of independent claim 15 recites:

A purification device for an exhaust gas of a diesel engine, the diesel engine comprising a catalyst which traps nitrogen oxides in the exhaust gas but decreases a nitrogen oxides trapping performance when poisoned by sulfur oxides in the exhaust gas, and a filter which traps particulate matter in the exhaust gas, the device comprising:

a programmable controller programmed to:

determine if an elimination of the sulfur oxides poisoning the catalyst is required;

perform a process of eliminating the sulfur oxides poisoning the catalyst, when elimination of the sulfur oxides poisoning the catalyst has been determined to be required;

determine if a regeneration of the filter is required while performing the process of eliminating the sulfur oxides;

perform the regeneration of the filter while interrupting the process of eliminating the sulfur oxides, when the regeneration of the filter has been determined to be required;

determine during the regeneration of the filter if a residual particulate matter in the filter has decreased to a level which does not damage the filter when the residual particulate matter in the filter burns; and

stop the regeneration of the filter and resume the process of eliminating the sulfur oxides poisoning the catalyst, when the residual particulate matter in the filter has decreased to a level which does not damage the filter when the residual particulate matter in the filter burns.

Neither Kobayashi, nor the remaining references applied in the rejection of the claims, suggest or disclose at least the above italicized features in the context of claim 15.

In contrast to claim 15, Kobayashi does not disclose interrupting a process of eliminating sulfur oxides in the catalyst when the regeneration of the particulate filter has been determined to be required during the process of eliminating the sulfur oxides. In the case that the trapped particulate matter is greater than the predetermined amount, the Kobayashi system first performs a regeneration of the particulate filter and then performs the elimination of sulfur oxides to completion after the regeneration of the particulate filter is completed. Thus, Kobayashi merely discloses performing a process of eliminating sulfur oxides from the catalyst after the regeneration of the particulate filter is completed. Kobayashi does not disclose interrupting the process of eliminating sulfur oxides from the catalyst when the particulate filter has been determined to require the regeneration and performing the regeneration with the process of eliminating sulfur oxides interrupted.

As in the Request for Reconsideration filed on March 20, 2007, Applicants again refer to the flow chart in FIG. 4 of Kobayashi to show that Kobayashi does not disclose interrupting the process of eliminating sulfur oxides from the catalyst when the particulate filter has been determined to require the regeneration, but only discloses first performing a

regeneration of the particulate filter and then performing the elimination of sulfur oxides to completion after the regeneration of the particulate filter is completed. In step S401 of FIG. 4, it is determined whether a process to recover the catalyst from S poisoning is required. If S poisoning recovery is not required (“NO”) the routine ends, and if S poisoning recovery is required (“YES”), the procedure moves on to steps S402, S403, S404 and S405 in sequence. In step S405, it is determined whether the instantaneous target temperature T_i of the filter has become equal to the final target temperature T_f of the filter. If not (“NO”), the procedure moves to step 406 and then branches back to step 402. Only when the particulate matter has been completely burned off as determined in step S405 (See col. 21, paragraph [0116]), does flow continue to step 407 where S poisoning recovery is performed. After S poisoning recovery is performed in step 407 the routine ends, i.e., S poisoning recovery is performed to completion. Significantly, once poisoning recovery begins in step 407, the flow chart of FIG. 4 shows that there is no interruption to determine if the filter needs to be regenerated. There is no branching from step 407 back to the sequence of steps S402, S403, S404 and S405. Thus, Kobayashi does not disclose interrupting the process of eliminating sulfur oxides from the catalyst when the particulate filter has been determined to require the regeneration.

Moreover, as discussed in the Request for Reconsideration filed on March 20, 2007, Kobayashi does not disclose that the control routine shown in FIG. 4 of Kobayashi is a process which is repeatedly performed at regular intervals, and thus there can be no overlap in consecutive performances of the control routine of FIG. 4 according to Kobayashi, and Kobayashi can not be properly interpreted as disclosing an “interruption” in S poisoning recovery to perform filter regeneration. With respect to the control routine of FIG. 4, Kobayashi states that the control routine is executed according to a control program stored in the ROM of the ECU 9, and that the control program is retrieved as needed by the CPU of the ECU 9 (cf. paragraph [0092]). It should be understood that the routine is performed occasionally and that the flowchart of FIG. 4 represents the entire process of filter regeneration and sulfur oxides elimination, not an instantaneous process repeatedly performed at regular intervals.

The Advisory Action states on page 2:

As shown in Figure 4 of Kobayashi et al., even when the catalyst is determined to require a SOx purge (step S401 with YES answer), a filter temperature must be less than a threshold value (i.e., step 405 with NO answer) in order for a regeneration of the filter to begin (in step S406)). If step S405 has a positive answer, then a SOx purge of the catalyst begins (in step S407) without a regeneration of the filter. During the next loops, if the answer for step S405 is negative, then the filter is allowed to regenerate by introducing a lean exhaust gas into an exhaust stream and the SOx purge of the catalyst is naturally interrupted because a different air –fuel condition (i.e., rich) is required for the purge. Thus, Kobayshi et al, obviously teach or suggest the claimed limitation in dispute.

Applicants submit, however, that there is no sequence of steps disclosed in Kobayashi that could be reasonably interpreted as interrupting a process of eliminating sulfur oxides in the catalyst when the regeneration of the particulate filter has been determined to be required during the process of eliminating the sulfur oxides. Take, for example, the scenario discussed in the Advisory Action where in one loop there is a YES in step S401 followed by a YES in step S405, and in a subsequent loop there is a YES in step S401 followed by a NO in step S405. For both the one loop and the subsequent loop there is no interruption of the SOx purge performed in Step S407. Moreover, the execution of the one loop and then the subsequent loop cannot be correctly interpreted as an interruption of a SOx purge, but instead constitute two separate SOx purges, each separately performed to completion. As discussed above, there can be no overlap in consecutive performances of the control routine of FIG. 4 according to Kobayashi. In sum, Kobayashi does not disclose interrupting a process of eliminating sulfur oxides in the catalyst when the regeneration of the particulate filter has been determined to be required during the process of eliminating the sulfur oxides.

Moreover, claim 15 further recites that the controller is programmed to “determine during the regeneration of the filter if a residual particulate matter in the filter has decreased to a level which does not damage the filter when the residual particulate matter in the filter burns; and stop the regeneration of the filter and resume the process of eliminating the sulfur oxides poisoning the catalyst, when the residual particulate matter in the filter has decreased to a level which does not damage the filter when the residual particulate matter in the filter

burns.” Kobayashi also fails to disclose these features of claim 15, as apparently recognized in the Office Action. The Office Action relies on Moraal for disclosing details of interrupting a regeneration cycle of a particulate filter if the filter exceeds a particular temperature range. Moraal, however, as noted in the Amendment filed on September 28, 2006, and the Request for Reconsideration filed on March 20, 2007, fails to cure the deficiencies of Kobayashi. Thus, even if Kobayashi were modified according to the teachings of Moraal, the combination would still not have a number of features of claim 15.

Hirota was cited for allegedly disclosing using a lean exhaust gas composition to purge particulate matter from a diesel particulate filter, but fails to cure the deficiencies of Kobayashi and Moraal.

Independent claims 27 and 28 include language corresponding to that discussed above with respect to claim 15, and thus are allowable for analogous reasons. Dependent claims 16-26 and 29 ultimately depend from claim 15, and are patentable for at least the same reasons.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.


The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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